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# DDAS Accident Report

## Accident details

<b>Report date:</b> 03/01/2008	<b>Accident number:</b> 457
<b>Accident time:</b> 07:15	<b>Accident Date:</b> 05/08/2004
<b>Where it occurred:</b> UNIS-Binas-3 ID 11287, municipality Bugojno	<b>Country:</b> Bosnia Herzegovina
<b>Primary cause:</b> Field control inadequacy (?)	<b>Secondary cause:</b> Inadequate training (?)
<b>Class:</b> Excavation accident	<b>Date of main report:</b> 12/08/2004
<b>ID original source:</b> Broj:01-02-4071-2/04	<b>Name of source:</b> BHMAL WL
<b>Organisation:</b> [Name removed]	
<b>Mine/device:</b> PMA-3 AP blast	<b>Ground condition:</b> bushes/scrub metal scrap wet
<b>Date record created:</b> 03/01/2008	<b>Date last modified:</b> 03/01/2008
<b>No of victims:</b> 1	<b>No of documents:</b> 1

## Map details

<b>Longitude:</b>	<b>Latitude:</b>
<b>Alt. coord. system:</b> y=6 453 046 x=4879220	<b>Coordinates fixed by:</b>
<b>Map east:</b>	<b>Map north:</b>
<b>Map scale:</b>	<b>Map series:</b>
<b>Map edition:</b>	<b>Map sheet:</b>
<b>Map name:</b>	

## Accident Notes

visor not worn or worn raised (?)  
inadequate training (?)  
mechanical follow-up (?)  
inadequate area marking (?)  
inadequate medical provision (?)  
inadequate training (?)  
inconsistent statements (?)  
protective equipment not worn (?)

## **Accident report**

This report was made available in 2006 and translated in 2007 specifically for entry to the DDAS. The content of the reports that were made available has been edited for anonymity and is summarised below.

Based on an initial report delivered to BHMAL by the demining organisation on the 10<sup>th</sup> of August 2004, the director of BHMAL formed an investigative committee with the following members: [Name removed] (presiding), [Name removed] and [Name removed]. This committee created a report which is the main information source for the following summary.

Another document from BHMAL was available: "Lessons Learned from the Demining Accident on 7 March 2004", dated 20 Aug 2004, signed by the BHMAL director, [Name removed]. This second document contains repeats the investigator's recommendations and the author clearly believed that PPE was not worn at the time of the accident. Another document entitled "Measures for Safe Work at Work Site ID 11287" written at BHMAL and not signed (possibly not finished or unofficial), dated 13 Aug 2004, contained no new information.

## **Conditions at the site**

The purpose of the demining task was to enable safe work in the factory "Slavko Rodić". The part next to the fence of the factory was mined. The test site was between the fence and the road and between the fence and the buildings. The fence marks the border of the demining work-site. There are recorded minefields with 430 mines.

The accident location was: y=6 453 046 x=4879220. The site is overgrown with bushes and trees and there is large amount of metal waste from the factory. The area is flat. It was not prepared with a machine, because the number of mines was high and there was a possibility that the flail would throw mines onto the safe area. [In other places it seems that it was prepared using a machine.]

At the time of accident, the weather conditions were suitable for work: moderately cloudy, 20° C. Prodders could penetrate to 5 cm depth, where a hard layer of soil started. The soil was wet.

## **The work-site layout and marking**

The administrative part of the work-site had been properly marked, according to the SOP and the national Standard of B&H. The border of the work-site towards the road and the barbed wire was not properly marked. Pegs in the lane where the accident happened were not placed at two metre intervals. The places for the disposal of undergrowth were not marked. The controlled area and the place for collecting metal fragments were properly marked. The locations of found mines were not marked according to the Standard. The found mines were marked with pegs wound with a yellow tape because there was no yellow paint available.

## **Supervision and discipline on the work-site: quality assurance**

Internal control: quality control officer [Name removed], reported on 30 July, 2 August and 5 August (on the day of accident). On 2nd August he checked a control area of 45 m<sup>2</sup> and

found no critical mistakes. The area was highly contaminated with metal. All minor mistakes were corrected.

External QA control officer, [Name removed] noted: locations of mines were not marked according to SOP; the clearance record was not properly maintained for one lane; daily reports were not made according to SOPs; lane 3 was not closed according to the SOP. The mistakes were not repeated, but corrected. The productivity was as expected.

The internal quality control officer [Name removed] has practically dug the whole controlled area. This leads to the conclusion that the metal contamination was so high that a full excavation is necessary.

During the investigation after the accident, a can of 7 cm diameter was found in a "cleared" area at depth 4-5 cm. A visual examination of the "deminated" area revealed an aluminium foil 20x27 cm with only one mark of a prod. It was concluded that the area was not treated with a prod, nor with a metal detector. A metal disk with a diameter 12 cm was also found on the cleared area.

The external control officer did not control the cleared area, which is why his estimate of the optimum productivity was not correct, due to his lack of experience.

The removal of mines was not performed according to the SOP and the Standard. We see that from the size of the holes where the mines were lying. The holes were only as big as the mines. The mines were not destroyed every day, but they were disposed of in the factory area.

The work was organised in two-man teams. The working time contained 10 min breaks after every 30 min of work, which is strange because a break is not necessary if the two-man drill is used.

Observing a deminer excavating a can in a working lane, a member of the investigating committee noticed a violation of the basic procedures in a working lane: working with a metal detector and excavation.

Overlap on the whole work-site border (i.e. the fence) was not done.

External control in the form of monitoring was not present.

### **Communication and connections**

Mobile phones were used.

### **The accident and the medical support**

The accident happened at 07:15 in the first lane next to the control point, during the assignment of deminers to other working lanes. The injured deminer was [Name removed], a member of the third two-man team. He was injured in lane 1. The other deminer in his team was [Name removed]. His Team leader was [Name removed]. In the days before the accident this team had the highest productivity.

[The Victim] started the work in lane 1. He worked near a metal barrel half buried in the ground, 1.6 metres from the fence. Before the accident he cleared 2 m<sup>2</sup>. He wore his PPE and had the necessary tools. He had been removing the undergrowth and surface metal pieces ahead of the base stick. He had been searching with his metal detector and had used the prod and a trowel. When he worked only with a prod, he investigated the whole

area ahead of the base stick where the vegetation had been removed. Just before the explosion he had not followed this procedure, as he said himself. He prodded ahead of the base stick when he activated a mine. He did not prod according to SOP: he penetrated the ground and pulled the prodder upwards (pushed the handle downwards) to excavate the soil.

He probably did not use his metal detector before the explosion: a can and a piece of metal tape were found in his lane. He prodded from the border of the area cleared from vegetation towards the base stick (in stead of starting from the base stick). He penetrated the ground with his prodder and then pushed it towards the ground (so that the top would go up) to make it look like the ground had been dug by a trowel. In one moment he pushed on top of a PMA-3 with the middle of his prodder, and activated it. This is the only way the prodder could be damaged in a way it was damaged.

The scene of accident was disturbed by the police, who performed their investigation before the investigating committee of BHMACH.

Demine r[Name removed] helped deminer [the Victim] after the explosion. He took off his helmet with a visor and his frag jacket and took him to the control point. [The Victim] was conscious. A paramedic gave him first aid one minute after the explosion. [The Victim] and the paramedic went to the hospital in Bugojno. They did not find an ophthalmologist there, so they went to Travnik, with the same outcome: [the Victim] was forwarded to Nova Bila hospital. There he was checked by an ophthalmologist, who sent him (at 16:00 hours) to Koševo ophthalmologic clinic. The day after he went there and stayed at the clinic.

Injuries: surface injuries of the left side of the face, eye, left arm (he is right-handed). Possible eye injuries: we are waiting for a medical report.

### **PPE and tools**

PPE (frag jacket, and a helmet with a visor) were found to be lying on the scene of accident. The helmet had no marks of explosion. The frag jacket was soiled; there were traces of mud on it. Dots of mud expected as a consequence of an explosion were not found on the frag jacket (and it may not have been being worn). The traces of mud might have occurred when the frag jacket was removed from the deminer after the explosion. A metal detector was not found; it had been taken by the police. The prodder was bent on the middle and had obvious traces of explosion.

### **The mine**

Before the accident, the following mines were found at the work-site: 118 pieces of PMA-3, 2 pieces of TMA-5, 30 pieces of UXO. During the machine preparation there were 6 explosions.

The mine causing the accident was a PMA-3, laid in the conventional way.

### **Conclusion**

The deminer caused the accident by violating the technical and safety procedures proscribed in the SOPs of the organisation and in the Standard of B&H. He pressed the prodder towards the ground and activated the PMA-3 with the central part of the prodder. This could only happen because he started the investigation from ahead, going backwards towards the base stick, instead of progressing forward.

The helmet and the visor do not have any traces of explosion. The deminer's head injuries show that the helmet with the visor was not used properly.

The productivity (speed) of the demining team No. 3 was higher than normal for such conditions. Also based on found metal pieces, we conclude that the area was not treated according to the Standard of B&H. The excavating procedure was also not according to the Standard. It does not provide confidence that the area is cleared up to 10 cm depth.

The marking was not adequate. The responsible persons are the team leader and the work-site leader. The control failed to notice the unrealistically high productivity. The mines were not destroyed on the same day they were found.

### **Recommendations**

1. to follow SOPs and the Standard
2. to do better quality control
3. excavation, retrieval, rendering safe, neutralisation and destruction of mines should be according to the standards
4. to organise one-day training with all teams, to remind them of the requirements of the standards

### **Victim Report**

<b>Victim number:</b> 604	<b>Name:</b> [Name removed]
<b>Age:</b>	<b>Gender:</b> Male
<b>Status:</b> deminer	<b>Fit for work:</b> not known
<b>Compensation:</b> Not made available	<b>Time to hospital:</b>
<b>Protection issued:</b> Frag jacket	<b>Protection used:</b> Frag jacket, short visor worn raised
Helmet	
Short visor	

### **Summary of injuries:**

severe Arm

severe Eye

severe Face

COMMENT: No medical report was made available.

### **Analysis**

The primary cause of this accident is listed as a "Field control inadequacy" because those in charge of the area did not ensure that the Victim followed SOPs/ His visor was raised and he working prodding back towards his base-stick and levering the prodder to break the ground. The secondary cause of this accident is listed as "Inadequate training" because there were so many errors at the site that the investigators recommended a period of retraining.

The "Inadequate medical provision" referenced under "Notes" refers to the lack of a CASEVAC plan or any knowledge of the capabilities of the hospitals in the vicinity. This, and other features of the demining group's approach to the work implies an amateur lack of preparation that would be a severe "Management control inadequacy".

